

REMARKS/ARGUMENTS

With entry of the instant amendment claims 1, 8, and 15 are amended. Claims 1-3, 5-10, and 12-26 are pending and under examination.

Claims 1, 8, and 15 have been amended to recite a “DNA polymerase” and “DNA polymerase domain”. This amendment adds no new matter. Support can be found throughout the application as filed, *e.g.*, at page 9, lines 23-25.

Cancellation of subject matter through amendment is without prejudice to revival for prosecution in a continuation or divisional application.

Rejection under 35 U.S.C. § 112, first paragraph—written description

Claims 1-26 are rejected as allegedly lacking proper written descriptive support in the specification. To the extent that the Examiner believes that the rejection applies to the amended claims, Applicants traverse the rejection for reasons of record and for the reasons additionally noted below.

The Examiner acknowledges that the application discloses any number of polymerases that can be modified with a sequence non-specific double-stranded nucleic acid binding as claimed; however, the Examiner also alleges that the specification only teaches that two of the polymerases, Δ Taq and Pfu polymerase, exhibit enhanced processivity when so joined to the sequence non-specific double-stranded nucleic acid binding domain. There is no legal requirement, however, that an application need contain extensive experimental data in order to fully describe the invention (see, the revised Written Description Guidelines). The specification properly supports the genus “polymerase” recited in the claims.

As the Examiner has noted, the application indeed discloses multiple polymerases (*e.g.*, page 6, line 30 to page 7, line 2; page 7, lines 16-20, as well as the section describing polymerase families that begins on page 9) for use in the invention. The specification also describes that sequence non-specific double-stranded nucleic acid binding domains enhance processivity of polymerases in general (see, *e.g.*, those same sections and the last paragraph of page 8 bridging to page 9). Although polymerases may have widely varying sequences, there is

an extensive body of knowledge in the art about polymerase structure and function. Applicants need not teach that which is known, accordingly “polymerase” properly describes the polymerase proteins of interest.

The Examiner contends that Applicants have not described the structural characteristics of polymerases that can be modified in accordance with the invention. However, Sso7d proteins as set forth in the claims have a broad ability to enhance processivity of a very diverse range of polymerases. This is supported by the data in the specification using polymerases representing two broad polymerase families and two Sso7d family members that differ in sequence. The breadth of the current claims is further supported by the description of known polymerases in the specification; and the level of knowledge in the art about polymerase structure. The issue in determining proper written description support is whether a person skilled in the art would understand applicant to have been in possession of the invention broadly claimed. In view of the support detailed above, one of skill would understand that Applicants had possession of the invention as a whole. Applicants therefore respectfully request withdrawal of the rejection.

Rejection under 35 U.S.C. § 112, first paragraph--enablement

Claims 1-26 are rejected as allegedly not enabled. The Examiner contends that the examples provided in the specification do not properly support the full scope of the claims. To the extent that the Examiner may believe that the rejection applies to the amended claims, Applicants respectfully traverse. In brief, as previously explained, polymerases are well known in the art, as are Sso7d and its related family members. Further, in addition to overall guidance, the specification provides working examples of polymerases that are members of widely diverse polymerase families that exhibit enhanced processivity when fused to Sso7d. The specification also provides a working example where Sac7d, which is related to Sso7d, but has a different sequence, exhibits effects on polymerase function that are similar to those of Sso7d.

As previously noted, Sso7d, when fused to *Taq* (a family A polymerase) or ΔTaq , enhances processivity of these polymerases (pages 34 and 35), just as it enhances processivity of *Pfu* polymerase. Similarly, fusion of a polymerase with Sac7d achieves similar results. For

example, Sac7d- Δ Taq fusion can achieve a result similar to Sso7d- Δ Taq fusion (see page 36 and Figure 2).

In addition, Applicants submit herewith a Declaration under 37 C.F.R. § 1.132 by Yan Wang providing data showing that additional polymerases exhibit enhanced processivity when fused to Sso7d compared to counterpart polymerases that are not fused to Sso7d. Dr. Wang's Declaration provides comparative data showing the effects of polymerase fusion to Sso7d on the processivity of *Thermus brockianus* (*Tbr*) polymerase, a Stoffel fragment of *Tbr* polymerase, and Klenow (*E. coli* polymerase I that lacks the 5' to 3' exonuclease domain). *Tbr* and *Taq* polymerases are not error-correcting polymerases, as they lack a functional 3' to 5' exonuclease domain. However, they retain the same general structure as *E. coli* Pol I, which does have error-correcting activity.

Additional comparative data are provided for *Taq* polymerase where the Sso7d is inserted at a position different from the *Taq* fusions described in the specification. The results show that Sso7d enhanced the processivity of all the polymerases to which it was fused.

Furthermore, direct comparative data that shows that Sso7d enhances processivity of a variant of *Pfu* and DeepVent® polymerases is provided in U.S. Patent Application Publication No. 2004/0219558 (the '558 application), which provides examples of experiments showing that Sso7d enhances processivity of a "hybrid" polymerase Hyb1 (Table 1, '558 application). Hyb1 is a hybrid polymerase of *Pfu* and DeepVent® polymerases, having 59 *Pfu* parent residues and 46 Deep Vent® parent residues at the positions where *Pfu* and DeepVent® differ from one another (see, Table 1, columns 7-8). As shown in Table 1 of the '558 application, processivity of the polymerase is improved by fusion to Sso7d ("HybS1" in Table 1).

The additional data therefore further demonstrate that Sso7d (and related family members) have a wide-ranging ability to enhance polymerase processivity. Dr. Wang in fact states that in view of their observations of the widespread enhancement effects of Sso7d on the processivity of multiple, diverse polymerases, including *Pfu* polymerase, variant *Pyrococcus* polymerases; *Taq* polymerase, *Tbr* polymerase, and Klenow, as well as fragments of *Taq* and

Tbr polymerases, one of skill could reasonably expect that Sso7d or a related family member, when fused to a polymerase of interest, would enhance processivity of that polymerase also.

In view of the foregoing, the scope of the claims is properly enabled. Applicants therefore respectfully request withdrawal of the rejection.

Provisional obviousness-type double patenting rejection

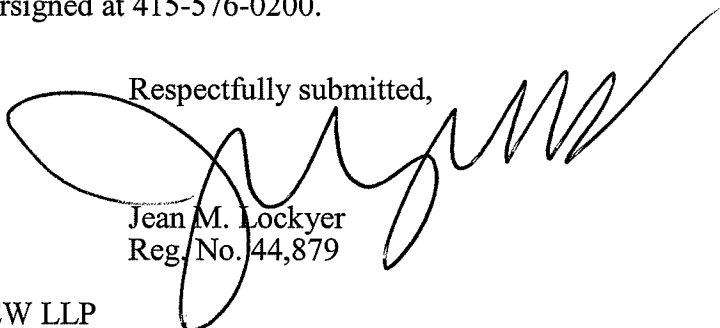
Claims 1-26 are provisionally rejected for alleged obviousness-type double patenting over claims 11, 15-19 and 22 of co-pending application no. 10/306,827. First, it is noted that in the Final Office Action, claims 11, 15-19 and 22 of application no. 10/306,827 are characterized as being drawn to methods of increasing the yield from a polymerase reaction. Should this provisional rejection be maintained, Applicants respectfully request further clarification of how claims 11, 15-19 and 22 are being applied to the claims in the present application. However, even if this rejection was further clarified, if the provisional rejection is the only rejection remaining in this application, Applicants respectfully request that the application be allowed to issue. See, *e.g.*, MPEP §804.I.B.1. This section of the MPEP notes that if a provisional nonstatutory obviousness-type double patenting rejection is the only rejection remaining in the earlier filed of the two pending applications, the provisional rejection should be withdrawn and the earlier-filed application allowed to issue without a terminal disclaimer.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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